AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions of claims in the application.

1. (Previously Presented): Semiconductor base structure for molecular electronics and molecular electronics-based biosensor applications, comprising a patterned semiconductor heterostructure surface forming the source, drain and gate contacts to build up hybrid electronic devices from this semiconductor base structure and one or more conductive organic wires.

2. (Currently Amended): Semiconductor base structure according to claim 1, wherein the organic wires are organic molecules with conjugated π-electron system, DNA oligonucleotides or [[car-bon]] carbon nanotubes.

3. (Previously Presented): Semiconductor base structure according to claim 1, wherein the one or more organic wires of this hybrid system are further functionalized with receptors for biomolecular recognition or receptors made of biomolecules which recognize bioactive molecules like hormones, polysaccharides, lipids, or drugs such that the device can be employed as highly sensitive electrical biosensor for the detection, analysis and quantification of specific biomolecules and their mutual interaction.

4. (Previously Presented): Semiconductor base structure according to claim 3, wherein the receptors for biomolecular recognition are antibodies or proteins.

5. (Previously Presented): Semiconductor base structure according to claim 1, wherein a semiconductor heterostructure which consists of a material stack of two thick undoped layers of material A separated by an extremely thin doped layer of different thin semiconductor material B or of different composition in case of compound semiconductors, with conductive source and drain electrodes on top of material A which are separated only by a very short, groove-like nano-gap.

6. (Previously Presented): Semiconductor base structure as in claim 5, wherein the thin, selectively etched layer fulfils the function of a field effect gate electrode when operating the hybrid electronic device as a molecular electronics or biosensing device.

7. (Currently Amended): Semiconductor base structure as in ~~claim1~~ claim 1, wherein the wires [[may]] consist of molecules of length fitting or exceeding the gap and being terminated and chemical endgroups able to covalently bind to the metal electrodes.

8. (Previously Presented): Semiconductor base structure as in claim 3, wherein a selective binding of a bio-molecular analyte to the organic nanowire changes the receptor's electron affinity towards the wire thus modifying its delocalized electron distribution and in turn leads to a change in molecular conductance.

9. (Previously Presented): Semiconductor base structure as in claim 5, wherein the heterostructure material stack comprises undoped AlGaAs for the thick layers and doped GaAs for the thin middle layer.

10. (Previously Presented): Semiconductor base structure as in claim 5, wherein the deposited metal is an alloy of Pd and Au.

11. (Withdrawn-Previously Presented): A method of producing a semiconductor base structure according to claim 5, wherein the material stack being cleaved perpendicular to the layer planes and the obtained cleavage plane being subsequently selectively etched such that only the central thin layer B is removed deep into the cleavage plane and a thin metal layer being deposited on the etched cleavage plane from an angle to form the conductive source and drain electrodes.

12. (Withdrawn-Previously Presented): A method for producing a semiconductor base structure according to claim 11, wherein the described cleavage is performed twice along different preferably perpendicular crystal directions and that two metal layers are being deposited sequentially from different angular directions in such way that a region of minimal electrodes distance forms exactly and only at the corner of the two cleavage claims.

13. (Withdrawn- Previously Presented): A method for producing a semiconductor base structure according to claim 11, wherein the semiconductor heterostructure is epitaxially grown by molecular beam epitaxy (MBE).

14. (Withdrawn- Previously Presented): A method for producing a semiconductor base structure for molecular electronics and molecular electronics-based biosensor applications according to claim 11, wherein the wire are being deposited by self-assembly techniques from solution or solid source evaporation in ultra-high vacuum, said semiconductor base structure comprising a patterned semiconductor heterostructure surface forming the source, drain and gate contacts to build up hybrid electronic devices from this semiconductor base structure and one or more conductive organic wires, in that the wires may consist of molecules of length fitting or exceeding the gap and being terminated and chemical endgroups able to covalently bend to the metal electrodes.